APPLICATION NO.   09/826,117

TITLE OF INVENTION: Hybrid Walsh Codes for CDMA

INVENTOR: Urbain A. von der Embse

Clean version of how the CLAIMS will read

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CLAIMS

WHAT IS CLAIMED IS:

Claim **1**. (cancelled)

Claim **2**. (cancelled)

Claim **3**. (cancelled)

Claim **4**. (cancelled)

Claim **5**. (cancelled)

Claim **6**. (cancelled)

Claim **7**. (currently amended) A method for generation of hybrid Walsh complex orthogonal codes for CDMA, said method comprising the steps:

classify the $N=2^M$ N-chip Walsh codes into even codes and odd codes according to their even and odd properties about their code centers for integer M,

said Walsh codes by definition are the {+1,-1} valued N orthogonal Hadamard codes re-ordered according to their sequency values where sequency is the average rate of phase changes over each N chip code length,

classify the N N-sample discrete real Fourier transform codes into even codes and odd codes and re-order said codes according to increasing frequency,

construct a one-to-one correspondence of said N real Walsh codes with said N real Fourier transform codes such that sequency corresponds to frequency, even codes correspond to even codes, and odd codes correspond to odd codes,

construct a mapping which uses said N real Fourier codes for the real and imaginary axis codes of the N N-sample discrete complex Fourier transform (DFT) codes and,

use said mapping combined with said correspondence to generate

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the real and imaginary axis component codes of said hybrid

Walsh codes $\widetilde{W}(u)$ for code index u=0,1,2,. . .,N-1 as re-

orderings of said real Walsh codes W(u) for u=1,2,. . .,N-1

defined by the equations

for u = 0, $\widetilde{W}(u)$ = W(0)   + jW(0),

for u = 1,2,…,N/2-1, $\widetilde{W}(u)$ = W(2u)   + jW(2u-1),

for u = N/2, $\widetilde{W}(u)$ = W(N-1)   + jW(N-1)), and

for u = N/2+1,…,N-1, $\widetilde{W}(u)$ = W(2N-2u-1) + jW(2N-2u).

Claim **8**.   (currently amended) The method of claim **7** wherein
said codes have properties:
code chips take values {1+j, -1+j, -1-j, 1-j} in the complex
    plane,
code chips with a renormalization and rotation of the code matrix
    take values {1, j, -1, -j} in said complex plane,
inphase axis codes of said codes are re-ordered Walsh or
    Hadamard codes and,
quadrature axis codes of said codes are re-ordered Walsh or
    Hadamard codes.

Claim **9**. (currently amended) A method for generation of
generalized hybrid Walsh codes for CDMA from code sets which
include said hybrid Walsh, said Hadamard, said Walsh, said DFT,
and pseudo-noise PN, said method comprising:
tensor product also called Kronecker product is used to
    construct said codes,
direct product is used to construct said codes,
functional combining is to construct said codes and,
combinations of tensor products, direct products, and functional
    combining are used to construct said codes.

Claim **10**. (cancelled)

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